

Remarks

Status of the Claims

Claims 1-19 remain pending in this patent application. By this Amendment, claims 1, 3 and 12 have been amended.

Allowable Subject Matter

Applicant notes with appreciation the Examiner's recognition of allowable subject matter in claims 5-8, 10, 11, 14-16, 18 and 19. For reasons presented below, Applicant respectfully submits that claims 1-19, all of the pending claims, are allowable.

Rejection of Claims 1 and 2 under § 103(a)

Claims 1 and 2 stand rejected under 35 USC § 103(a) as being unpatentable over U.S. patent No. 5,870,871 (den Boer) in view of U.S. patent No. 5,808,706 (Bae) and U.S. patent No. 6,256,076 B1 (Bae et al.). Applicant respectfully traverses this rejection insofar as it might be deemed applicable to claims 1 and 2 as now presented.

As to the disclosure in the den Boer et al. patent, the Examiner states, "Fig. 1 shows the storage capacitors." Presumably, the Examiner is referring to the auxiliary storage capacitors 11 in the array of four cells of an LCD shown in Fig. 1 of the den Boer et al. patent. According to column 4, lines 37-39, of the den Boer et al. patent, each of these capacitors is "defined on one side by a gate line 7 and on the other side by an independent storage capacitor electrode 12."

In the den Boer display device, the individual LCD cells do not employ more than one storage capacitor, as the Examiner concedes. The Examiner also concedes that den Boer et al. do not disclose "the contact hole structure. As a remedy for the deficiencies of the den Boer et al. disclosure vis-à-vis the requirements of Applicant's claims 1 and 2, the Examiner cites the Bae patent

for its disclosure of "liquid crystal display devices having cross coupled storage capacitors where the required plurality of capacitors in the required manner is disclosed." The Examiner also cites the Bae et al. patent for its disclosure of "liquid crystal displays having switching elements and storage capacitors and a manufacturing method thereof where the required contact hole structure is disclosed." The Examiner concludes that it would have been obvious "to include the required plurality of storage capacitors in the required manner and the required contact hole structure in den Boer et al. as taught by Bae and Bae et al. respectively in order to have a liquid crystal display device with higher performance."

In the LCDs disclosed in the Bae patent, the storage capacitor electrodes extend over and between adjacent pixel electrodes. Each of the storage capacitor electrodes is electrically connected to a pixel electrode and capacitively coupled to a pixel electrode in an adjacent cell. See, for example, the storage capacitor electrodes c1, c2 illustrated in Fig. 4 of the Bae patent.

As shown in Fig. 9 of the Bae et al. patent, pixel electrodes 81, 82 overlap storage capacitor electrodes 21, 22, respectively, to form storage capacitors. The storage capacitor electrodes 21, 22 are electrically connected by bridges 211, 221 and contact holes 72, 73, respectively, to the pixel electrodes 82, 83 of adjacent cells.

Without acquiescing in the rejection, Applicant has amended independent claim 1 to specify that the capacitor electrode is *formed above the gate line*.

The Examiner has not identified, and Applicant has not found, any disclosure in the den Boer et al. patent or in the Bae and Bae et al. patents that would make obvious the combination of disclosures in those patents that the Examiner has proposed.

Furthermore, the proposed combination of disclosures would not satisfy the requirements of claims 1 and 2 as now presented. There is no disclosure in either of the Bae and Bae et al. patents of at least two storage capacitors disposed between a gate line and a capacitor electrode formed above the gate line. In the LCDs disclosed by Bae and Bae et al., the disposition of the capacitor electrode above the pixel electrode reduces the aperture ratio, whereas, in the LCD disclosed and claimed by Applicant, the capacitance is made greater without reducing the aperture ratio. Also, there is no disclosure in either of the Bae and Bae et al. patents of a gate line connected to the capacitor electrode via a contact hole passing through the at least two storage capacitors. Accordingly, the disclosures in the Bae and Bae et al. patents cannot remedy the deficiencies in the den Boer et al. patent vis-à-vis the requirements of claim 1 as amended. In addition, there is no disclosure in any of the den Boer et al., Bae and Bae et al. patents that can satisfy the specific requirements recited in dependent claim 2.

In view of the foregoing discussion, Applicant submits that the den Boer et al., Bae and Bae et al. patents cannot properly serve as a basis for rejecting Applicant's claims 1 and 2 as now presented under 35 USC § 103.

Rejection of Claims 3, 4 and 9 under § 103(a)

Claims 3, 4 and 9 stand rejected under 35 USC § 103(a) as being unpatentable over den Boer in view of Bae and Bae et al. and further in view of U.S. patent No. 6,052,162 (Shimada et al.). Applicant respectfully traverses this rejection insofar as it might be deemed applicable to claims 3, 4 and 9 as now presented.

As characterized by the Examiner, the Shimada et al. patent offers a disclosure of "a transmission type liquid crystal display device with connecting electrode and pixel electrode connected via contact hole through interlayer

insulating film and method for fabricating where the required protective layer is disclosed." From the foregoing statement by the Examiner, Applicant cannot determine what *specific* disclosure in the Shimada et al. patent the Examiner is relying on to meet the particular requirements of Applicant's claims 3, 4 and 9. Also, the Examiner's stated rationale for combining the disclosures in the den Boer et al., Bae, Bae et al. and Shimada et al. patents, "higher performance," provides no guidance as to specific disclosures in any of the applied patents that would make the Examiner's proposed combination of disclosures obvious.

Without acquiescing in the rejection, Applicant has amended independent claim 1 to specify that the capacitor electrode is formed *above the gate line*. Applicant has also amended dependent claim 3 to specify that a storage electrode is provided on the gate insulating film *to overlap the gate line*.

In the discussion of the rejection of claims 1 and 2 above, Applicant has shown that independent claim 1 as amended is allowable over the disclosures in the den Boer et al., Bae and Bae et al. patents. The disclosure in the Shimada et al. patent, as characterized by the Examiner and as discerned by the Applicant, offers no remedy for deficiencies in these disclosures vis-à-vis the requirements of claim 1. The allowability of claim 1 inheres, of course, in dependent claims 3, 4 and 9. In addition, the requirement of claim 3 as amended, that the storage electrode overlaps the gate line, is not suggested or made obvious by any disclosures in the den Boer et al., Bae, Bae et al. and Shimada et al. patents. These disclosures also do not suggest or make obvious the additional requirements of claims 4 and 9.

In view of the foregoing discussion, Applicant respectfully submits that the den Boer et al., Bae, Bae et al. and Shimada et al. patents cannot properly serve as a basis for rejecting Applicant's claims 3, 4 and 9 as now presented under 35 USC § 103.

Rejection of Claims 12, 13 and 17 under § 103(a)

Claims 12, 13 and 17 stand rejected under 35 USC § 103(a) as being unpatentable over U.S. patent No. 5,796,448 (Kim) in view of U.S. patent No. 6,057,896 (Rho et al.) and U.S. patent No. 5,724,107 (Nishikawa et al.). Applicant respectfully traverses this rejection insofar as it might be deemed applicable to claims 12, 13 and 17 as now presented.

First, Applicant observes that claim 17 depends from claim 16, which the Examiner recognized as reciting allowable subject matter. Accordingly, Applicant assumes that the rejection of claim 17 was inadvertent and trusts that the Examiner will find claim 17 to be allowable along with parent claim 16.

To characterize the disclosure in the Kim patent, on page 4 of the Office Action, the Examiner recites the title of the invention in the Kim patent followed by language that is nearly identical with language in lines 1-11 of the Abstract in the Kim patent.

The Examiner concedes that the Kim patent does not "disclose the required protective layer/contact hole and the required gate insulating layer in the required manner." As a remedy for deficiencies in the Kim disclosure vis-à-vis the requirements of Applicant's claims 12 and 13, the Examiner cites the Rho et al. patent for its disclosure of "liquid crystal displays using organic insulating material for a passivation layer and/or a gate insulating laery (sic) and manufacturing method there of (from the title of the invention) where the required protective layer/contact hole structures are disclosed." The Examiner also cites the Nishikawa et al. patent for its disclosure of a "liquid crystal display with transparent storage capacitors for holding electric charges (from the title of the invention) where the required gate insulating layer in the required manner is disclosed." The Examiner concludes that it would have been obvious "to include the required protective layer/contact hole structure and the required gate insulating layer in the required manner in Kim as taught

by Rho et al. and Nishikawa et al. respectively in order to manufacture a liquid crystal display device with higher performance."

The Examiner has not provided a clear identification of disclosures in the Kim, Rho et al. and Nishikawa et al. patents that correspond with steps recited in Applicant's claims 12 and 13. Applicant trusts that the Examiner will recognize that the vagueness of the rejection unfairly places Applicant in the position of having to speculate as to the specific disclosures in these patents that the Examiner regards as meeting the requirements of Applicant's claims under 35 USC § 103.

Without acquiescing in the rejection, Applicant has amended the third-recited step in independent claim 12 to specify that the storage electrode is *to overlap the gate line*.

The Examiner has not identified, and Applicant has not found, any disclosure in the Kim patent or in the Rho et al. and Nishikawa et al. patents that would make obvious the combination of disclosures in those patents that the Examiner has proposed. Applicant respectfully submits that it is not enough for the Examiner to make the general assertion of "higher performance" as the sole basis for concluding that the proposed combination would have been obvious.

In the LCD disclosed by Kim, upper electrode 66, insulating layer 62 and lower electrode 60 form a parasitic capacitor. Upper electrode 57, insulating layer 62 and lower electrode 53 form a storage capacitor. As clearly shown in the drawing figures, none of the capacitor electrodes can be fairly characterized as overlapping gate line 82, as required by claim 12 as amended. Furthermore, the Kim LCD does not have "at least two contact holes to expose the gate line" and does not have "a capacitor electrode electrically contacting the gate line," as required by claim 12 as amended. As best Applicant can discern, there are no disclosures in the Rho et al. and Nishikawa et al. patents that can remedy

the deficiencies of the Kim disclosure vis-à-vis the requirements of claim 12 as amended.

The allowability of claim 12 inheres, of course, in dependent claim 13. Moreover, the additional requirements of claim 13 are not suggested or made obvious by any disclosures in the Kim, Rho et al. and Nishikawa et al. patents.

Other Cited Prior Art

Applicant has considered the other prior art reference cited by the Examiner. This reference was not applied against the claims in this application and does not warrant further discussion.

In view of the amendments and remarks presented herein, Applicant respectfully requests that the Examiner withdraw the rejections stated in the last Office Action and recognize claims 1-15, all of the claims now pending in this application, as allowable.

The Examiner is invited to contact Frederick R. Handren, Reg. No. 32,874, at (703) 205-8066 in the Washington, DC area if a discussion with Applicant's representative would be helpful for resolving any issues remaining in this application.

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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge any payment or credit any overpayment to Deposit Account No. 02-2448. This authorization applies to any additional fees required under 37 CFR §1.16 and 37 CFR §1.17 and in particular to fees for an extension of time.

Respectfully submitted,

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